



"you see ELIZA,  
its like this..."

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☐ I want the Source Version of ELIZA    ☐ I want only the Protected ELIZA file or ELIZA.COM  
(Source can be listed and modified as well as run) . . . **\$45**    (Can be run but not listed or modified) . . . . . **\$25**

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# READ WHAT THE COMPUTER MAGAZINES SAY ABOUT ELIZA

## MICROCOMPUTING

April 1982

*"As for this particular version, it's a delightful entertainment. To answer my own question to ELIZA, I would say that the money people spend on her is well spent. In fact, \$25 is dirt-cheap for so much fun.*

*"It's also an ideal medium for showing off your system. As the program's publicity release aptly puts it, 'You'll never again wonder how to respond when one of your friends says, 'Okay, let's see what this computer of yours can actually do!'"*

## CREATIVE COMPUTING

1982 Buyers Guide Issue

*"ELIZA, a classic program with a fair amount of educational potential has found its way into BASIC.*

*"This version contains a few extra touches which existed in the original but were absent from previous BASIC translations.*

*"ELIZA has potential use in various subjects. She could obviously be used in a course in psychology, but could also provide material for courses in communications, computer literacy, and other areas."*

## PC MAGAZINE

January 1983

*"Now ELIZA has arrived in a full evocation of the original.*

*"ELIZA's response pattern closely emulates the structure of conversations practiced by non directive psychotherapists.*

*"You'll be impressed when you put yourself on the couch and converse with ELIZA. It is much more than a mere game. ELIZA is a simple yet convincing demonstration of Artificial Intelligence. And as the sales literature for the program suggests, it's just the sort of disk to pop into your computer when some skeptical friend asks, 'Let's see what this computer of yours can actually do!'"*

*"For an additional \$20, you can buy the unprotected source file for the program, written in BASIC. With the source file version, you can watch as ELIZA's mind is laid open for your inspection and alteration. You don't need to be a programming genius to figure out ways to customize this program. You could arrange for ELIZA to greet specific clients, repeat some inside joke, or casually drop a few meaningful names of people or places of personal interest.*

*"You could also use the source version of ELIZA as a framework for writing your own Artificial Intelligence program.*

*"Now PC owners can discover what an impressive experience she still is."*

## PERSONAL COMPUTER AGE

Volume 2.3 (February 1983)

*"ELIZA can provide you and your friends with hours of entertainment.*

*"Previous microcomputer versions of the original ELIZA were incomplete, but this innovative program contains all elements of the original.*

*"ELIZA is a fascinating and a fun addition to your software collection."*

## POPULAR COMPUTING

July 1983

*"Don't buy the protected version. For the extra \$20, you get a chance to look at the program, marvel at its simplicity, and even change it. Changing ELIZA lets you personalize it. Instead of having the program answer 'Do computers worry you?' when the word computer is mentioned, you could make ELIZA tell your daughter 'If you spent more time programming, you might learn something about computers.' Personalization is especially effective at parties.*

*"ELIZA is an exceptional program, one that's fun to use, shows off your machine, and has great historical interest."*

## OUR VERSION OF ELIZA IS CURRENTLY IN USE AT THE FOLLOWING INSTITUTIONS

Baylor University  
Bell Labs  
Brown University  
California School of Professional Psychology  
Chicago Museum of Science and Industry  
Children's Television Workshop  
Control Data Corporation  
Cornell University  
Drake University  
Gallaudet College  
General Electric Corporation  
George Washington University  
Indiana State University  
Indianapolis Memorial Hospital  
Iowa State University  
Kansas City Center for the Performing Arts  
Lockheed California  
Los Alamos National Laboratories

Louisiana State University  
Massachusetts General Hospital  
Massachusetts Institute of Technology  
Memphis State University  
Naval Administrative Command  
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Northwestern University  
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University of Wisconsin  
Veteran's Administration  
Wright Patterson Air Force Base  
Xerox Corporation

# Eliza—A Software Classic For Your Micro

By Thomas W. Parsons

**E**liza is a legend in the field of artificial intelligence. Developed by Joseph Weizenbaum of MIT in 1965, Eliza was named after Eliza Doolittle in George Bernard Shaw's play *Pygmalion*. Shaw's Eliza was a flower girl who was taught to talk "like a lady" by the phonologist Henry Higgins. Weizenbaum's program can carry on a conversation which seems remarkably intelligent.

Until recently, Eliza was available only on large computers, although a few stripped-down versions had been written for micros. Now, from Artificial Intelligence Research Group of Los Angeles, CA, comes the full Eliza, running under CP/M in 40K bytes of memory.

The program comes on an eight-inch, single-density disk and is available in two versions. (Eliza is also available on 5¼-inch disks to run under CP/M on an Apple II with a Z-80 Softcard or under Applesoft DOS 3.3.) For an introductory price of \$25, you get an executable file, ELIZA.COM, plus a simple customizer, INSTALL.COM, which adapts the program to your system. There is also a file containing a sample

conversation and an auxiliary file, STRINGS.FIL, which contains Eliza's script. For \$20 more, you can get the source programs, ELIZA.BAS and INSTALL.BAS (written in Microsoft's Basic-80), in case you want to monkey around with the program.

In principle, Eliza can play any desired role; in practice, it is usually made to act as a nondirective psychological counsellor. The program begins with HOW DO YOU DO. PLEASE TELL ME YOUR PROBLEM and the fun begins. You talk to Eliza and it replies, scanning your comments and composing its responses by means of a surprisingly simple set of rules. Response is instantaneous and the conversation is saved in a buffer which can be stored on disk. The conversations are frequently memorable and always entertaining.

## The History of Eliza

This program is more than just another software toy. It was a major scientific development in its day and is still a classic.

The debate over whether computers can *think*, or can ever reach a stage of development which will enable them to think, seems to be as old as computers themselves. It is no nearer to being resolved today than it was when it was first raised. The facts are still too scanty and the

human emotions involved still too strong.

Computers that think have, of course, been a staple of science fiction; one thinks immediately of HAL in Arthur Clarke's *2001* or of the multitude of thinking, talking and occasionally incarnate computers that run through the work of Robert Heinlein. In real life, computers have so far fared much more poorly. They have trouble speaking intelligibly and can recognize speech only under very restricted conditions. As for intelligence the question remains: Is thought (whatever that is) within the capability of digital electronics?

Alan Turing proposed an experiment, a test which, he said, any computer able to think should be able to pass. In Turing's test, a human interviews two unknown respondents. One respondent is another human being; the other, a computer attempting to answer like a human being. The interviewer probes the two respondents with questions designed to unmask the computer. A computer clever enough to avoid being unmasked, Turing said, can be said to think.

In light of this, you can imagine the stir Eliza made when it appeared. The original Miss Doolittle's presentation at the Embassy was trivial by comparison. In final form, Eliza



performed so realistically that it was difficult to convince some users that they were only talking to a machine.

To give you the flavor of the program, I can do no better than to copy a portion of a conversation from Eliza's publicity release.

Men are all alike.

IN WHAT WAY?

They're always bugging us about something or other.

CAN YOU THINK OF A SPECIFIC EXAMPLE?

Well, my boyfriend made me come here.

YOUR BOYFRIEND MADE YOU COME HERE—THAT'S INTERESTING.

He says I'm depressed much of the time.

I AM SORRY TO HEAR YOU ARE DEPRESSED.

It's true. I am unhappy.

DO YOU THINK COMING HERE WILL HELP YOU NOT TO BE UNHAPPY?

The program's comments are the ones in all capitals, in case you couldn't tell.

Notice how the program picks up the user's words and uses them to draw the user out. At times it seems to detect meanings of which the user is unaware. This particular example ends with what seems an uncanny perception on the part of the computer:

WHY DO YOU THINK I DON'T ARGUE WITH YOU?

You are afraid of me.

DOES IT PLEASE YOU TO BELIEVE I AM AFRAID OF YOU?

My father is afraid of everybody.

REALLY, EVERYBODY?

My father is very fearful.

WHAT ELSE COMES TO MIND WHEN YOU THINK OF YOUR FATHER?

Bullies.

DOES THAT HAVE ANYTHING TO DO WITH THE FACT THAT YOUR BOYFRIEND MADE YOU COME HERE?

## Principles of Operation

This impressive performance is achieved by the strategic use of a very simple scheme. Every time you type a sentence, Eliza scans it and searches for keywords. These keywords are stacked roughly in order of significance. The program then goes through the stack, starting with the most significant entry, and tries to build a reply based on the keyword.

A keyword is usable only if it occurs in a specified context, so for each keyword the program checks your sentence to see whether the context is there. If it is, the program then transforms the keyword and context according to a certain transformation

rule to generate the reply; otherwise the program tries the next keyword on the stack. The rest of the program mostly provides for cases where no usable keywords are found and devises ways of varying the transformation rules chosen.

The programmer must also provide a script. This is a table of keywords, significance values, contexts and transformation rules. The performance of the program depends critically on the way the script is written, and the impressiveness of Eliza results from the skill with which its script has been designed.

Each keyword-context pair can have a number of different transformations associated with it. For example, the keyword "yes" has four possible transformations:

- You seem quite positive.
- You are sure?
- I see.
- I understand.

The transformations simply ignore the message and deliver a canned reply. The program cycles through these transformations in order, and in this way provides a degree of variety.

The program maintains a special list known as Memory. In response to the keyword MY, the selected transformation is stored in the Memory list as well as being used for the reply. Then later, under certain circumstances when Eliza can't find a keyword, it can provide a reply from a transformation selected at random from the Memory list. (That's where "Does this have anything to do with the fact that your boyfriend made you come here?" came from.)

## The Role of Psychotherapist

It should be clear from this summary that Eliza's conversational powers are actually feeble. It knows nothing about your world and is incapable of initiating any conversation. This is why Eliza scripts are almost universally based on the psychotherapy model.

In the mind of the layman, a shrink is one of the few people in the world who doesn't need to know anything about the outside world. If you say, "I like hamburgers" to an ordinary person and the person replies, "Tell me more about hamburgers," you will decide that that person is an idiot. But if a *shrink* says, "Tell me more about hamburgers," this is obviously a probing question put to you by a highly-trained professional who

has discerned some hidden (and possibly embarrassing) significance in your casual remark.

Furthermore, there is a school of psychiatric counselling which holds that the counsellor should make no comments, judgments or suggestions to the patient, but should simply lead him on and draw him out, keeping him talking about his problems until he finds solutions for himself.

This nondirective technique is a natural for Eliza, since it provides a procedural cloak behind which most of its weaknesses can be hidden. The user is primed in advance to expect behavior typical of a shrink, and Eliza's first words confirm this expectation: "PLEASE TELL ME YOUR PROBLEM."

The answers in the script contain lots of material also designed to keep the conversation directed toward the user's problems. The script abounds in phrases like

"Do you dream often?"

"Perhaps in your fantasy..."

"Has your treatment made you...?"

"Does it please you to believe...?"

"Do you believe it normal to be...?"

Where does all this leave Turing's test? If the user is cooperative (and possibly a bit naive), and if the random choices of the program fall just right, the imitation can be convincing indeed. But remember that in Turing's test you are not supposed to take the respondent at face value. Your job is to uncover a fraud. If you know how Eliza works, you can have a lot of fun doing this. In my initial run, I was downright malicious; here is a part of what happened:

HOW DO YOU DO. PLEASE TELL ME YOUR PROBLEM.

I have to evaluate you.

PERHAPS IN YOUR FANTASY WE HAVE TO EVALUATE EACH OTHER.

Yes.

YOU SEEM QUITE POSITIVE.

Yes.

YOU ARE SURE?

Yes.

I SEE.

Yes.

I UNDERSTAND.

Yes.

YOU SEEM QUITE POSITIVE.

Yes.

YOU ARE SURE?

Yes.

I SEE.

Good.

I AM NOT SURE I UNDERSTAND YOU FULLY.

Well, I can't explain.



HOW DO YOU KNOW YOU CAN'T EXPLAIN?

How does one know anything?

WHY DO YOU ASK?

Because I don't know.

IS THAT THE REAL REASON?

You're the analyst—you tell me.

WHAT MAKES YOU THINK I AM THE

ANALYST—YOU TELL YOU?

That's what the promotional material said.

DOES THAT QUESTION INTEREST YOU?

No, but it will interest my readers.

WHY NOT?

Why not indeed?

WHAT IS IT YOU REALLY WANT TO KNOW?

Whether the money people spend on you is well spent.

WE WERE DISCUSSING YOU—NOT ME.

That's funny—I thought we were discussing you.

YOU ARE NOT REALLY TALKING ABOUT ME, ARE YOU?

Yes I am.

I UNDERSTAND.

Yes.

YOU SEEM QUITE POSITIVE.

Yes.

YOU ARE SURE?

Sure I'm sure.

IS IT BECAUSE YOU ARE SURE THAT YOU CAME TO ME?

No.

ARE YOU SAYING "NO" JUST TO BE

NEGATIVE?

No, I am saying "no" in answer to your question.

YOU ARE BEING A BIT NEGATIVE.

Would you rather have me lie to you?

WHY DO YOU THINK I RATHER HAVE YOU?

Would you please re-phrase your question?

YOU SEEM TO HAVE AVOIDED SPEAKING

OF YOUR PARENTS ALTOGETHER.

They don't read *Microcomputing*.

DO YOU FEEL STRONGLY ABOUT DISCUSSING SUCH THINGS?

Well, a little more circulation would do no harm.

HOW COME?

We were discussing you—not me.

YOU LIKE TO THINK I—NOT YOU—DON'T YOU?

This sample takes Eliza around the "YES loop" a couple of times. It also uncovers some of the weaknesses in the transformation rules. In particular, *I* and *me* are changed to *you*, and *you* is changed to *I*. Obviously, sometimes *you* should be changed to *me* instead, but this distinction is beyond Eliza's analytical powers. In addition it occasionally misses the conversion altogether ("you tell you"). Clearly *you* represents a pitfall, and this is probably the reason

for answers like "We were discussing you—not me," since this tends to keep the interviewer talking about himself.

Another pitfall arises out of the fact that Eliza stops its scan when it encounters a comma. Hence in analyzing "No, but it will interest my readers," it misses the main point and simply responds to the "No." In general, compound sentences are lost on Eliza.

## Conclusion

These shortcomings are present in Weizenbaum's original Eliza, and not only the version from Artificial Intelligence Research Group. As for this particular version, it's a delightful entertainment. To answer my own question to Eliza, I would say that the money people spend on her is well spent. In fact, \$25 is dirt-cheap for so much fun.

It's also an ideal medium for showing off your system. As the program's publicity release aptly puts it, "You'll never again wonder how to respond when one of your friends says, 'Okay, let's see what this computer of yours can actually do!'" ■

## \*\*\* HERE'S WHAT SOME OF OUR CUSTOMERS HAVE TO SAY ABOUT ELIZA: \*\*\*

"I just received my copy of ELIZA and I am very happy with it. We used it at the West Coast Computer Faire, implemented on our Talking CP/M system to demonstrate the Votrax Type-N-Talk Speech Synthesizer. It helped keep the synthesizer saying interesting, unexpected things and kept the traffic in front of the Votrax booth high during the faire. My compliments on a robust and interesting program."

D. W.  
Menlo Park, California

"It's about time! I first experimented with the original ELIZA on the IBM 7094 at MIT in 1967, and found it quite amazing. Then, when the microcomputer revolution began in 1975, one of my first thoughts was to get my hands on a version of ELIZA that would run on one of the small, personal computers that were starting to appear. Since then, I have come across a number of ELIZA implementations, but none of them even approached the conversational depth that I recalled from my MIT experience. So when your ELIZA arrived last week, I was prepared for another disappointment. To my astonishment, however, I discovered that you had, in fact, duplicated the original program in all its glory! Congratulations on a fine job."

R. S.  
Houston, Texas

"Just a brief note to let you know how much we enjoy your ELIZA program. As you suggest in your ad, there's really no better way to convey the power of computers to a non-technical person than to sit him down in front of a terminal and let him converse with one. It has become standard operating procedure at our house to bring out ELIZA whenever guests come over, and she never fails to delight and entertain. Thank you for making this program available."

M. T.  
Phoenix, Arizona

"As the teacher of a computer science course at our local high school, I am always looking for more effective methods of introducing my students to computers. Your ELIZA program has proven to be very helpful in that regard, both as a means of arousing student interest and as a tool for teaching the principles of machine intelligence. Please place us on your mailing list and keep us informed of any new programs you may offer."

S. J.  
Chicago, Illinois

"Bravo! I'm in love with ELIZA! Keep up the good work."

F. P.  
Camden, New Jersey